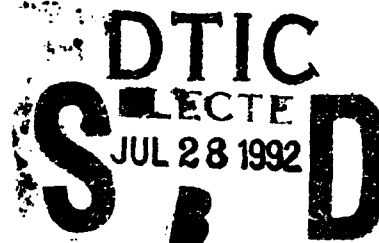


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LESSONS LEARNED CONCERNING MC&G  
AREA, PRODUCT,  
AND DISTRIBUTION REQUIREMENTS  
IN OPERATION DESERT SHIELD/DESERT STORM

by

Teresa J. Boyd

GM-13 Defense Mapping Agency

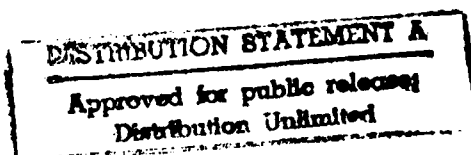
A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: *Teresa J. Boyd*

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19 ABSTRACT (Continue on reverse if necessary and identify by block number) During Operation Desert Storm, the Defense Mapping Agency provided all of the necessary mapping, charting, and geodetic products to all of the soldiers, airmen, sailors, and marine deployed to Desert Storm. Many lessons can be learned about related or reoccurring MC&G area and product requirement problems experienced in the initial deployment phase through the defensive phase. Lessons can also be learned from inter and intra-theater distribution problems experienced in the initial deployment phase through the offensive phase of operations. Problems included confusion over requirements and priorities of product needs and difficulties in obtaining dedicated transportation allocations for lift of MC&G materials. These problems could have been avoided if the appropriate staff and command actions had been taken in time to validate requirements.			
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**Abstract of  
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in Operation Desert Shield/Desert Storm**

During Operation Desert Storm, the Defense Mapping Agency provided all of the necessary mapping, charting, and geodetic products to all of the soldiers, airmen, sailors, and marines deployed to Desert Storm. Many lessons can be learned about related or reoccurring MC&G area and product requirement problems experienced in the initial deployment phase through the defensive phase. Lessons can also be learned from inter and intra-theater distribution problems experienced in the initial deployment phase through the offensive phase of operations. Problems included confusion over requirements and priorities of product needs, and difficulties in obtaining dedicated transportation allocations for lift of MC&G materials. These problems could have been avoided if the appropriate staff and command actions had been taken in time to validate requirements.

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## **LIST OF ACRONYMS**

<b>AID</b>	<b>Automatic Initial Distribution System</b>
<b>AoR</b>	<b>Area of Responsibility</b>
<b>CAS</b>	<b>Close Air Support</b>
<b>CENTAF/INV</b>	<b>Central Air Force/Inventory</b>
<b>CENTCOM</b>	<b>Central Command</b>
<b>CPX</b>	<b>Command Post Exercise</b>
<b>DMA</b>	<b>Defense Mapping Agency</b>
<b>FTX</b>	<b>Field Training Exercise</b>
<b>FLIP</b>	<b>Flight Information Plans</b>
<b>FORSCOM</b>	<b>Forces Command</b>
<b>HQ</b>	<b>Headquarters</b>
<b>J2</b>	<b>Joint Task Force (Intelligence)</b>
<b>JOG-A</b>	<b>Joint Operations Graphics-Air</b>
<b>JOPEs</b>	<b>Joint Operations, Planning and Execution System</b>
<b>LANDSAT</b>	<b>Land Satellite System</b>
<b>MC&amp;G</b>	<b>Mapping, Charting, and Geodesy</b>
<b>MSEL</b>	<b>Master Scenerio Event List</b>
<b>TMD</b>	<b>Theater Map Depot</b>
<b>TPFDD</b>	<b>Time Phased Force Deployment Data</b>
<b>TLM</b>	<b>Topographic Line Map</b>
<b>USCENTCOM</b>	<b>United States Central Command</b>
<b>USEUCOM</b>	<b>United States European Command</b>

**LESSONS LEARNED CONCERNING MC&G  
AREA, PRODUCT  
AND DISTRIBUTION REQUIREMENTS IN  
OPERATION DESERT SHIELD/DESERT STORM**

**CHAPTER I**

**INTRODUCTION**

**"Just as our soldiers must carry their weapons and ammunition as they deploy, they must also carry the maps which make maneuver and fire effective on the battlefield."<sup>1</sup>**

**Commander, 24th Infantry Division**

At the operational level of war, the Commander requires detailed information in the form of maps, charts, and geodetic products in order to make accurate decisions concerning route selection, mobility planning, and targeting. During Operation Desert Storm, the Defense Mapping Agency (DMA) provided all of the necessary mapping, charting, and geodetic (MC&G) products to all of the soldiers, sailors, airmen, and marines deployed to Desert Storm. As a result, the forces of Operation Desert Storm "had more and better maps, charts, and precise positioning materials than any previous military operation."<sup>2</sup> These MC&G products were critical to the success of all operational phases. DMA provided all-service support to ground, sea, and air forces through the production

and distribution of products to include topographic hardcopy and digital products, nautical products, tercom matrices, air combat charts, and precision points. Approximately 3,400 different MC&G product-lines were used in theater to plan operations, deploy forces, and execute battle plans.

Desert Storm production requirements challenged the DMA, as the Kuwait theater of operations expanded over a one million square mile area. This area of operation is compared as being twice the size of the World War II European Theater of Operation and roughly fifteen times larger than Korea. In order to meet production demands, DMA responded by producing over 10,000 new products, tens of millions of copies of maps, and hundreds of thousands of photographic materials. DMA produced an entire theater coverage at the 1:50,000 or 1:100,000 scale in updated Topographic Line Maps (TLMs), and nearly 8,000 precision points.

Defense Mapping Agency's production response to Desert Storm clearly dignifies the agency's ability to accomplish her mission in a time of crisis by providing "timely and tailored" MC&G products to the user in need. But when one takes a closer look into the planning and execution phases, questions begin to surface as to why

requirements were not fully identified in the planning phase, and why were priorities and allocations for distribution of MC&G materials not properly coordinated? Were critical MC&G requirements realistically considered during the deliberate planning process of this operation?

Many lessons can be learned from Operation Desert Storm. This paper will discuss some major reoccurring and/or related problems encountered concerning area, product, and distribution requirements throughout the course of this operation. The course of Operation Desert Storm has been tracked basically as a four phased approach: the Initial Deployment Phase, the Defensive Phase, the Offensive Phase, and the Retrograde Phase. Problems associated with area and product requirements in the initial and defensive phases are discussed in Chapter II. Chapter III will discuss inter-theater and intra-theater distribution problems sequentially as they pertain to each phase of the war. Conclusions are discussed in Chapter IV pertaining to the problems presented within this paper, and recommendations for future improvements to Crisis Management are provided within Chapter V.



## CHAPTER II

### AREA AND PRODUCT REQUIREMENTS

#### Initial Deployment Phase

In the initial deployment phase, it appears that DMA was not properly informed and kept up to date in regard to the Area of Responsibility (AoR). Most units wanted their maps and charts in hand before deploying and as a result, many maps and charts were printed that were not current; and in some instances, were out of the operational area.<sup>3</sup> This was largely because the operational area was in question during the early stages of deployment.

Upon declaration of C-Day, DMA received numerous requests for large quantities of various MC&G products from customers with an interest in Operation Desert Shield. These requests were, in some instances, not in the actual theater of operations or were for quantities above normal planning stocks. Many requests also conflicted with CENTCOM requirements, and others had no priority designation.<sup>4</sup>

In the initial deployment phase, to support land forces, only 50 percent of the required 1:50,000 Topographic Line Maps, City Maps, and Terrain Analysis (hard copy) products existed and

most were out of date. To support air forces, 90 percent of the required Joint Operations Graphics-Air (JOG-A) existed, but most were out of date. To support naval forces, 80 percent of the required hydrographic charts existed, and all were current. The major limitation (in addition to ample time) to producing the non-existing products was the lack of source material. This required DMA to seek alternative solutions to temporarily solve the problem.<sup>3</sup>

As a temporary solution for areas of no coverage, DMA produced LANDSAT image maps to serve as an interim product before emphasis was placed on the production of 1:50,000 TLMs.

There were massive issues of MC&G products during this phase of deployment. At the same time, DMA was moving out to fully stock the theater map depot (TMD). There was confusion over priorities, areas of operation, and quantities required.<sup>4</sup> Confusion began when the area plan was activated and centered around priorities for maps of Iraq, Kuwait, and Saudi Arabia.

Confusion centered around coordination between area requirements and lift priorities for MC&G products. MC&G area requirement decisions made by the Forward Headquarters, based on crisis operational needs, were sometimes inadvertently

canceled out by the Rear Headquarters. The Rear operated on guidance from the front, however, at times that guidance was not forthcoming, primarily as a result of poor technical communication capabilities, which sometimes required the Rear to act on the best information available. 7

The Forward Headquarters actively interacted with deployed forces and deployed service component headquarters to determine what geographic areas were required to be mapped and printed, and submitted those requirements to the DMA in order to support planned operations. At the same time, many requisitions were made to DMA directly for existing MC&G material that was current and available in stock. However, confusion and conflict began to arise concerning reprints of MC&G materials to support deployments and reprints of MC&G materials to support hundreds of extra players who wanted to get in the game. 8

In addition, some service components sent map requirements to the Forward Headquarters and others sent map requirements to the Rear Headquarters, depending on his communications capabilities and the information available to the requestor. Again, poor technical communication capabilities between the Forward and the Rear Headquarters resulted in coordination problems between product requirements

and priorities for lift allocations to support those requirements. As a result, the Forward HQ's product requirements for maps, based on need, were often not synchronized with lift priorities established by the Rear HQ.

### Defensive Phase

Confusion over area and product requirements began at Desert Shield and lasted until DMA and USCENCOM discussed the problems.<sup>7</sup> As the scope of the war changed to defensive operations, scope changes were as expected (i.e. Ground Defensive and Air Information, then Ground Defensive Information, and finally, Continuation of Air Information).

Area requirements originally focused on defensive positions where troops clustered in Saudi Arabia, but later shifted to an offensive posture with emphasis on Kuwait. Production was temporarily delayed at DMA until requirements were identified to support the shift to offensive operations. With this came the reorientation of priorities. Problems coordinating map requirements and lift priorities between the Forward and Rear Headquarters were soon straightened out by mid-december. Priorities for movement of MC&G products were made on a case-by-

considerable amount of maps in Norfolk to move, transporters were concerned that DMA would request an airlift and not fill it. Thus, DMA was required to submit case-by-case requests for movement in lieu of established priority to ship.<sup>10</sup>

There was also considerable confusion over USEUCOM's role as a supporting command.<sup>11</sup> Confusion centered around production of products according to priorities. USCENTCOM had higher priority for DMA products, but USEUCOM should have also had a high priority in order to receive MC&G products for supporting command requirements. USEUCOM worked with DMA to get products and eventually DMA was able to support them after they deployed into Turkey.

As units employed, USCENTCOM planned for defensive operations and requirements were reflected in their plans. Early production of LANDSAT image maps had been initiated to serve as an interim product for areas of no coverage. To support changes in scope to defensive operations, USCENTCOM later determined that this interim solution must be abandoned and emphasis be placed on the production of the 1:50,000 scale TLMs of Iraq and Kuwait.<sup>12</sup>

## CHAPTER III

### DISTRIBUTION REQUIREMENTS

#### Inter-Theater Distribution

Although USCENTCOM requested that prepositioned war reserve stocks be held by DMA in theater, most units wanted their maps and charts in hand prior to deployment.<sup>13</sup> Many units did not take maps and charts because stocks were depleted by filling unit orders on a first come, first serve basis, whether units were deployed or not. This resulted in rapid stock outages, deployed units without maps, and undeployed units with maps.

At the kick-off of Operation Desert Shield, the Department of Defense gave the initial order and almost every unit began to order a full set of maps to go. The Army ordered complete sets of maps for each platoon, and full sets were also ordered for each Brigade and each Division. This soon created confusion over quantities required and it became apparent that procedures for a chain of ordering was needed in order to prevent unnecessary duplication of orders and confusion over quantities required for operations. In addition, Air Force accounts began to multiply dramatically, as

practically every wing maintained their own individual accounts.

Concurrent to the confusion over priorities, areas of operation, and quantities required, problems concerning distribution requirements were developing. Problems were encountered in attempting to obtain dedicated airlift allocations and also tracking the shipments of MC&G materials from distribution depots to their final destinations.<sup>14</sup> USCENTCOM had only allocated four pallets of MC&G materials for airlift distribution into the TPFDD system. DMA also did not appear on the priority list until the defensive phase of Operation Desert Storm.

Joint Operations, Planning, and Execution System (JOPES) interface and TPFDD continued to be a daily concern, even when USCENTCOM arranged priorities to include airlift of MC&G materials. Lift allocations were not known because the allocations had not properly been planned and entered into JOPES.<sup>15</sup> This required DMA to constantly maintain direct communication, almost on a daily basis to validate verbal allocations for airlift of MC&G materials into the theater of operations.

## Intra-Theater Distribution

Initially, DMA was to be responsible for activating the TMD and performing administrative functions. USCENTCOM was to be responsible for operating the TMD after activation by DMA. However, this did not happen. DMA activated the TMD, operated it, and provided the administrative support. This primarily happened because the designated FORSCOM platoon was not deployed and the platoon that was deployed was not properly trained and was poorly prepared to support defensive operations at the TMD.<sup>14</sup>

After activation of the TMD, DMA should have turned over operations to the distribution platoon provided by the Army Reserves. Since properly trained personnel were not provided, DMA operated the TMD throughout the course of the war with personnel augmentation support from the Army, Air Force, Marines, Navy, and the Brits.<sup>17</sup> In addition, the TMD was undermanned and problems continually revolved around keeping trained personnel at the depot. At the highest point, only 38 people were employed as opposed to the original allocation requiring 70 people.<sup>18</sup>



The TMD was not prepared to support a contingency. Some charts on the shelves were outdated, new additions had not been placed on the shelves, and only adequate quantities of almost every map sheet was in stock. This placed a tremendous strain on the TMD to meet unit requirements. As a result, CENTAF/INV had to continuously reduce unit requests to allow each unit to get an initial set of maps required for operations.<sup>19</sup>

The defensive phase saw a tremendous effort from the TMD in support of the automatic initial distribution (AID) system. This system was established and used to issue new products and to issue new editions of products.

Confusion over intra-theater distribution and problems with Flight Information Publications (FLIP) distribution required a great deal of time and attention.<sup>20</sup> It was initially believed that in wartime FLIPs were not used. This proved wrong. FLIPs are required for flights into and out of the theater area. There were many more air units going into the theater than expected. In order to accommodate these units, DMA set up a system to identify FLIPs and get them directly to the air units.<sup>21</sup>

## CHAPTER IV

### CONCLUSIONS

Major problems concerning area and product needs created considerable confusion over requirements in the initial deployment phase. Confusion centered around the Area of Responsibility and resulted in maps and charts issued that were out of the operational area. Source coverage could have been obtained sooner if the Area of Responsibility had been identified in the initial planning process and requirements had been identified and validated prior to submitting requests to DMA for production and distribution. The appropriate priorities for MC&G items should be identified and integrated with projected mobilization, distribution, and sustainment requirements upon selection of force structure and course of action. This will provide DMA with a base line sufficient to manage the distribution of current operational stocks, and prevent avoidable stock depletions. The establishment of priorities helps to establish emphasis for production and distribution to ensure that MC&G support materials go to those units destined for immediate combat or employment, and to those units designated critical

to the ultimate success of theater operations. In an effort to reduce the occurrence of multiplying service accounts and unnecessary duplications, the service components must be responsible for redistribution and issue of MC&G materials to subordinate organizations. Procedures for redistribution and issue are currently being reviewed by DMA and incorporated into the MC&G Distribution Doctrine.<sup>22</sup>

The identification and validation of changing production demands could have more efficiently been communicated if USCENTCOM had designated one central point of contact for validation of all requirements. Instead, DMA sought guidance for production of products and requirement validation from the Forward and the Rear MC&G Headquarters which resulted in confusion, contradicted guidance, cancelled operational needs, and delayed production at DMA.

Dedicated airlift for transportation of MC&G materials remained to be a major concern throughout all phases of this operation. Airlift allocations should have been identified and properly loaded into JOPES. In addition, priorities should have been coordinated for all lift allocations and identified within the TPFDD to also include incremental support for sustainment. If large

scale products are to be used, particularly in quantities that exceed what is held in the operational area, then time is required in order to conduct a technical evaluation to ensure that products are accurate, current, detailed. Once new products are produced, strategic lift requirements becomes the critical factor for getting the products to the forces.

Previous operations such as Operation Urgent Fury have provided lessons that should have been learned in regard to notifying and informing DMA as early as possible of MC&B needs and requirements. Requirements for production of products to support URGENT FURY forces were not submitted to DMA in time for DMA to produce the critically needed 1:25,000 scale tactical maps. As a result, the Army, Air Force, Navy, and the Marines created their own tactical maps. These maps were difficult to read and had incompatible grid overlays which degraded, and in some cases prevented the effective employment of naval gunfire and close air support (CAS). The initial shortage of maps was eventually overcome by the short fused production of 1:25,000 scale tactical maps by DMA. Unfortunately, DMA was not tasked to produce these maps early enough to support the forces and these

high quality maps did not arrive on Grenada until the operation was largely over.<sup>23</sup>

Field Training Exercise (FTX) Consolidated-See Sources conducted on August 31, 1990, provided lessons that should have been learned concerning transportation priorities for lift of MC&G materials. As a result, large quantities of products were delayed while attempts were made to obtain adequate lift support.

It was also observed in Command Post Exercise (CPX) Arms 86 conducted on June 23, 1986, that MC&G exercise play was marginal. Recommendations were made by DMA in 1986 to encourage the MC&G staff officers to become more involved in planning early to challenge MC&G planning and DMA responsiveness.

It appears that these lessons have not been learned and continued to reoccur in operations such as Desert Storm. DMA can produce significant quantities of a wide variety of high quality products, but appropriate staff and command actions must be taken in time to ensure that adequate map, chart, and geodetic information can be supplied.

## CHAPTER V

### RECOMMENDATIONS

Procedures should be produced by Unified and Specified Commands, DMA, service components, and supporting commands to direct all deploying or deployed units to submit requirements for MC&G products through their command headquarters to the appropriate U&S Command for validation. The deployed MC&G staff should be identified as the single point of contact for MC&G requirement validation and additional MC&G production guidance. A single MC&G staff will help to prevent conflicting product priorities.

MC&G staff officers of the U&S Commands should become more involved early in the deliberate planning process, so as to initiate MSEL items early enough to ensure DMA responses will support deploying forces, and in order to help to avoid unnecessary short fused production requirements at DMA.

U&S Commands and components should ensure that procedures and trained personnel are used for planning and prioritizing MC&G requirements as a crisis develops. Immediately upon selection of course of action and force structure, MC&G combat

support requirements must be provided to DMA. MC&G planning in support of Oplans and Conplans should also include requirements for transportation priorities and allocations for lift of MC&G materials.

Serious consideration by U&S Commands and DMA needs to be given to appointing more personnel to liaison positions to service each U&S Command as a team unit. Considerations should also include these liaisons playing a more active role in the identification, prioritization, and validation of all MC&G requirements during the deliberate planning process.

In the future, more realistic consideration should be given to MC&G requirements and priorities during the deliberate planning process and communicated to DMA immediately. "Realistic considerations" includes the true awareness of the uniqueness of the individually tailored MC&G item. MC&G products must not be equated to traditional items of supply that can be used in any theater of operations or that can readily be replaced with like items upon their expiration date. When map stocks run low, time is required to perform a careful technical evaluation in order to incorporate cultural changes, datum conversions, boundary differences, etc. Timely communication

of validated MC&G combat support requirements is critical in order for DMA to ensure that MC&G products are accurate, current, detailed, and in the hands of the forces prior to deployment.

Effective planning and communication of MC&G requirements can streamline the overall process of providing the best MC&G materials that our forces may require. Inefficient planning for MC&G items in the early stages of planning can set the stage to trigger a domino effect of more problems throughout all phases of operations. In the next operation, the forces, instead of DMA, may feel the impact of non-synchronized priorities, requirements, and allocations. The process of proper planning for MC&G items should never become an attribute to the "fog of war".<sup>24</sup>

"Adequate map support is one of my most urgent requirements, and could become an absolute war stopper."<sup>25</sup>

Commander, U.S. ARCENT



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